

V(A). Planned Program (Summary)

Program # 12

1. Name of the Planned Program

Sustainable Energy

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
206	Basic Plant Biology	0%		50%	
402	Engineering Systems and Equipment	0%		25%	
403	Waste Disposal, Recycling, and Reuse	100%		25%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Actual	1.0	0.0	1.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
15322	0	55839	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
15322	0	55839	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

1. Conducted research into alternative biofuels and methods of production that are well-suited for the Intermountain West.

- 2. Publish in peer-reviewed journals and other professional outlets.
- 3. Take the research that is done and adapt that research so useful practical strategies might be followed in producer biofuels to the extent that it can be shown to be beneficial in terms of benefits and costs.

2. Brief description of the target audience

For experiment station faculty their target audiences are geared primarily towards extension specialists, county agents, and other scientists; the specialists' audiences include peers, county agents, federal and state organizations, producer groups, state and local government, and the general public. County agents work cooperatively with federal, state, and local governments, citizen groups, and the public to address sustainable energy issues in their areas.

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	{NO DATA}	{NO DATA}	{NO DATA}	{NO DATA}
Actual	280	675	0	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2010
 Plan:
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Actual	0	10	10

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of Graduate Students/Post Docs Trained

	Year	Target	Actual
	2010	{No Data Entered}	0

Output #2

Output Measure

- Contract/Grant Dollars Generated

	Year	Target	Actual
	2010	{No Data Entered}	50000

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of clientele gaining sustainable energy knowledge
2	Number of clientele who implement sustainable energy practices

Outcome #1

1. Outcome Measures

Number of clientele gaining sustainable energy knowledge

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	353

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The U.S. and rest of the world have relied on nonrenewable energy sources for over a century. There is a general consensus that the current pace of energy consumption can continue to rely on traditional energy sources for only so long, then it will be necessary to shift to an alternative source of energy. Besides the energy supply issue, many are concerned about the effects of current energy sources and uses on the earth's environments including ground, water, and air contamination. Finally, there is an increasing concern about whether the U.S. can become energy independent, essentially relying on renewable energy sources of all types.

What has been done

USU Extension and Agricultural Experiment Station converted a failed project implementing induced blanket reactor (IBR) technology to a successfully operating system. The manure digester is a renewable, alternative energy project that is capable of producing 48kW/hr of 'green' electricity. The digester produces bio-gas containing 66% methane. The digester system cost about \$875,000 to construct and modify. Effluent heat exchanger provides a 5 degree F increase in manure temperature at an 8.3 gal/min in feed rate.

Results

Since commissioning in June 2009 the engine generator set has produced 180mW of electricity. The dairy operating the manure digester is being paid \$.032/kW or \$5760 to date. The electricity to consumers in Utah is valued at \$13,500 (\$.075). The same amount of electricity is valued at \$32,400 (\$.18) in 'green' markets such as California when considered as being produced from a renewable energy source.

4. Associated Knowledge Areas

KA Code	Knowledge Area
206	Basic Plant Biology
402	Engineering Systems and Equipment
403	Waste Disposal, Recycling, and Reuse

Outcome #2

1. Outcome Measures

Number of clientele who implement sustainable energy practices

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	263

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

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V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges

Brief Explanation

There have been so many factors that have influenced our ability to follow through on the goals that were set. We have received a reduction in budget from state sources. County-level budgets have also been dramatically impacted. The southern portion of the state experienced a severe drought, a continuation of the past several years. Competing public priorities have further reduced budgets to CES and UAES. The composition of the state's population continues to change, with a higher immigration and in-migration of individuals outside the goal and program areas established in previous years. These and other factors have combined to reduce the effectiveness of goal attainment, though all goals were achieved to some extent.

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)
- Case Study
- Comparisons between program participants (individuals, group, organizations) and non-participants
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- Comparison between locales where the program operates and sites without program intervention

Evaluation Results

Key Items of Evaluation